

Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendments, claims 1-11, 13-55 and 62 are pending in the application, with claims 1, 24-26, 50-52, 54, 55, and 62 being the independent claims. Claims 1-3, 16, 17, 19, 20, 22-28, 31, 39, 41, 43, 48-52, 54, 55, 62, and 63 are sought to be amended. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendments and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding rejections and that they be withdrawn.

It is noted that this application is related to a number of other patent(s) and application(s). The claims presented in this application should be interpreted solely based on the file history of this application, not the file history of any related patent(s) or application(s).

With respect to the present application, Applicants hereby rescind any disclaimer of claim scope made in the parent application or any predecessor or related application. The Examiner is advised that any previous disclaimer of claim scope, if any in the parent application or any predecessor or related application, and the alleged prior art that it was made to allegedly avoid, may need to be revisited. Also, no disclaimer of claim scope, if any, in the present application should be read back into any parent, predecessor or related application.

Rejection under 35 U.S.C. § 102

Claims 1-7, 9, 13-17, 20-22, 24, 25, and 62 were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by JP 11-354409 to Shiozawa (“Shiozawa”). Applicants respectfully traverse.

Claim 1 recites features distinguishable over the cited reference. For example, claim 1 recites the following:

wherein the radiation absorber is configured to have a gas concentration in a path of the beam of radiation that is controllably non-uniform in an unobstructed plane perpendicular to an optical axis of the radiation system, or the projection system, or both the radiation system and the projection system, and

wherein the beam of radiation traverses through a top surface and a bottom surface of the at least one enclosure, the top and bottom surfaces substantially parallel to each other, while avoiding interaction with an optical element between the top and bottom surfaces of the at least one enclosure.

(Emphasis added.)

Claims 24, 25, and 62 recite similar distinguishing features. The Examiner points to Shiozawa in rejecting claims 1, 24, 25, and 62. (*See* Office Action, 08/28/08, pp. 2 and 3.)

Shiozawa appears to disclose an optical system, where an absorbent gas interacts with a beam of radiation. (*See* paras. [0059]-[0061] and FIGs. 3 and 5.) The optical system is divided into two enclosed spaces by a light transmission optical element (i.e., element 10d in FIG. 3 and element 101d in FIG. 5) such that a concentration of absorbent gas can be independently controlled in each enclosed space. (*See id.*) For instance, the optical system illustrated in FIG. 3 of Shiozawa includes a light transmission optical element at a top and bottom surface of the optical system (elements 10c and 10e, respectively), a light transmission optical element that divides the optical

system into two enclosures (element 10d), and air holes that inject a gas into each enclosure (elements 31a, 31b, 32a, and 32b). (*See* para. [0060] and FIG. 3.) In this configuration of FIG. 3, the beam of radiation is received by the light transmission optical element at the top surface (element 3c) and enters a first enclosure of the optical system (element 10a). (*See* FIG. 3.) The beam of radiation is then received by the light transmission optical element that divides the optical system into the two enclosures and enters the second enclosure of the optical system. (*See* FIG. 3.) The transmission optical element that divides the two enclosures *is arranged in a slanted position in relation to the top and bottom surfaces of the optical system*, where in each enclosure of the optical system, the absorbent gas interacts with the beam of radiation. (*See* paras. [0059-0061] and FIG. 3.) Nowhere does Shiozawa teach or suggest “a radiation absorber comprising a gas supply configured to supply an absorbent gas at a controlled concentration to at least one enclosure traversed by the beam of radiation, the absorbent gas serving to absorb radiation energy delivered by the beam of radiation to the substrate during exposure of the radiation-sensitive material to the patterned beam of radiation, wherein the radiation absorber is configured to have a gas concentration in a path of the beam of radiation that is controllably non-uniform in an unobstructed plane perpendicular to an optical axis of the radiation system, or the projection system, or both the radiation system and the projection system, and **wherein the beam of radiation traverses through a top surface and a bottom surface of the at least one enclosure, the top and bottom surfaces substantially parallel to each other, while avoiding interaction with an optical element between the top and bottom surfaces of the at least one enclosure,**” as recited in claim 1 (emphasis added), and similarly recited in claims 24, 25, and 62.

In view of the above, Applicants respectfully request that the Examiner find claims 1, 24, 25, and 62 allowable over the cited reference. At least based on their dependency on claim 1, claims 2-7, 9, 13-17, and 20-22 should also be found allowable over the cited reference, as well as for their additional distinguishing features.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejections under 35 U.S.C. § 102(b).

Rejections under 35 U.S.C. § 103

Nishi in view of Ishihara

Claims 26-34, 36, 39, 41, 43, 44, 47, 48, and 52-55 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Pat. No. 6,545,746 to Nishi ("Nishi") in view of U.S. Pat. No. 6,240,610 to Ishihara *et al.* (hereinafter "Ishihara"). Applicants respectfully traverse.

Claims 26, 52, 54, and 55 recite features distinguishable over the cited references. For example, claim 26 recites the following:

an enclosure having a top surface and a bottom surface, the beam of radiation traversing through the top and bottom surfaces of the enclosure, and having a radiation-energy detector configured to determine the energy of the beam of radiation, the beam of radiation passing at least partly through a region of interactive gas,

wherein the detector comprises **a sensor located within the enclosure and configured to output a signal that represents an interaction of the beam of radiation with the region of gas**, and to measure, out of a path of the beam of radiation, particles scattered from the path of the beam of radiation due to the interaction to determine the amount of interaction of the beam of radiation with the region of gas.

(Emphasis added.)

Claims 52, 54, and 55 recite similar distinguishing features. The Examiner points to Nishi in rejecting claims 26, 52, 54, and 55. (*See* Office Action, 08/28/08, pp. 4 and 5.)

Nishi appears to disclose an optical system with an integrator sensor (element 9 of FIG. 1), a light detection system (element 30 of FIG. 8), and a light absorption container (element 141 in FIGs. 10(a) and 10(b)). The integrator sensor is configured to determine an intensity of an illuminating light from a light source. (*See* col. 14, lines 52-67 and FIG. 1.) The light detection system is configured to detect a reflected light from a wafer in order to monitor reflectivity of the wafer surface, illuminance non-uniformity, and measurement of a spatial image. (*See* col. 17, lines 32-42.) *Neither the integrator sensor nor the light detection system is located within the light absorption container*, an enclosure where an ozone gas interacts with the illuminating light from the light source. (*See* col. 35, line 61 to col. 36, line 46.) Accordingly, the integrator sensor and the light detection system are not used to provide an output signal that represents an interaction between the illuminating light and the gas dispersed in the light absorption container. Nowhere does Nishi teach or suggest “an enclosure having a top surface and a bottom surface, the beam of radiation traversing through the top and bottom surfaces of the enclosure, and having a radiation-energy detector configured to determine the energy of the beam of radiation, the beam of radiation passing at least partly through a region of interactive gas, wherein the detector comprises **a sensor located within the enclosure and configured to output a signal that represents an interaction of the beam of radiation with the region of gas**, and to measure, out of a path of the beam of radiation, particles scattered from the path of the beam of radiation due to the interaction to determine the amount of interaction of the beam of radiation with the region of gas,” as recited in claim 26, and similarly recited in claims 52, 54, and 55.

The Examiner states, which Applicants do not acquiesce to, that Ishihara teaches measuring particles scattered from a path of the beam of radiation due to the interaction of the beam with the interactive gas. (*See* Office Action, 08/28/08, p. 7.) However, Ishihara is not stated to teach, nor does it suggest, at least the above-noted distinguishing features of claims 26, 52, 54, and 55 with respect to Nishi. Therefore, because Ishihara cannot cure the deficiencies of Nishi, these applied references cannot be used to establish a *prima facie* case of obviousness.

In view of the above, Applicants respectfully request the Examiner to find claims 26, 52, 54, and 55 patentable over the cited references. At least based on their dependency to claims 26 and 52, claims 27-34, 36, 39, 41, 43, 44, 47, 48, and 53 should also be found patentable over the applied references, as well as for their additional distinguishing features.

Mori in view of Ishihara

Claims 26, 27, 30, 52, 54, and 55 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Pat. Appl. Pub. No. 2001/0030740 to Mori *et al.* (hereinafter “Mori”) in view of Ishihara. Applicants respectfully traverse.

Claims 26, 52, 54, and 55 recite features distinguishable over the cited references. For example, claim 26 recites the following:

an enclosure having a top surface and a bottom surface, the beam of radiation traversing through the top and bottom surfaces of the enclosure, and having a radiation-energy detector configured to determine the energy of the beam of radiation, the beam of radiation passing at least partly through a region of interactive gas,
wherein the detector comprises a sensor located within the enclosure and configured to output a signal that represents an interaction of the beam of radiation with the region of gas, and to

measure, out of a path of the beam of radiation, particles scattered from the path of the beam of radiation due to the interaction to determine the amount of interaction of the beam of radiation with the region of gas.

(Emphasis added.)

Claims 52, 54, and 55 recite similar distinguishing features. The Examiner points to Mori in rejecting claims 26, 52, 54, and 55. (*See* Office Action, 08/28/08, pp. 7 and 8.)

Mori appears to disclose an optical system in a gas chamber (element 102 of FIG. 11). (*See* para. [0081].) In particular, light can pass through a top surface of the chamber, traverse through an optical system, and be used to image a substrate. (*See* FIG. 11.) The optical system includes light detectors that are configured to sense the quantity of light and illumination intensity as light traverses through the optical system and onto the substrate. (*See* paras. [0077]-[00790.] The imaging of the substrate occurs *entirely within the chamber, where light does not pass through a bottom surface of the chamber.* (*See* para. [0081] and FIG. 11.) In this configuration, the chamber can be filled with a gas such as nitrogen, helium, or argon. (*See* para. [0081].) Nowhere does Mori teach or suggest **“an enclosure having a top surface and a bottom surface, the beam of radiation traversing through the top and bottom surfaces of the enclosure, and having a radiation-energy detector configured to determine the energy of the beam of radiation, the beam of radiation passing at least partly through a region of interactive gas, wherein the detector comprises a sensor located within the enclosure and configured to output a signal that represents an interaction of the beam of radiation with the region of gas, and to measure, out of a path of the beam of radiation, particles scattered from the path of the beam of radiation due to the interaction to determine the amount of**

interaction of the beam of radiation with the region of gas,” as recited in claim 26 (emphasis added), and similarly in claims 52, 54, and 55.

The Examiner states, which Applicants do not acquiesce to, that Ishihara teaches measuring particles scattered from a path of the beam of radiation due to the interaction of the beam with the interactive gas. (*See* Office Action, 08/28/08, p. 8.) However, Ishihara is not stated to teach, nor does it suggest, at least the above-noted distinguishing features of claims 26, 52, 54, and 55 with respect to Mori. Therefore, because Ishihara cannot cure the deficiencies of Mori, these applied references cannot be used to establish a *prima facie* case of obviousness.

In view of the above, Applicants respectfully request the Examiner to find claims 26, 52, 54, and 55 patentable over the cited references. At least based on their dependency to claim 26, claims 27 and 30 should also be found patentable over the applied references, as well as for their additional distinguishing features.

Shiozawa in view of Ishihara

Claims 26-34, 36-39, 41, 43, 44, 47, 48, and 50-55 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shiozawa in view of Ishihara. Applicants respectfully traverse.

Claims 26, 50-52, 54, and 55 recite features distinguishable over the cited references. For example, claim 26 recites the following:

an enclosure having a top surface and a bottom surface, the beam of radiation traversing through the top and bottom surfaces of the enclosure, and having a radiation-energy detector configured to determine the energy of the beam of radiation, the beam of radiation passing at least partly through a region of interactive gas,

wherein the detector comprises **a sensor located within the enclosure and configured to output a signal that represents an interaction of the beam of radiation with the region of gas**, and to measure, out of a path of the beam of radiation, particles scattered from the path of the beam of radiation due to the interaction to determine the amount of interaction of the beam of radiation with the region of gas.

(Emphasis added.)

Claims 50-52, 54, and 55 recite similar distinguishing features. The Examiner points to Shiozawa in rejecting claims 26, 50-52, 54, and 55. (*See* Office Action, 08/28/08, pp. 8 and 9.)

Shiozawa appears to disclose an optical system with a light exposure monitor (element 17 of FIG. 1) and a light absorption enclosure (elements 10 and 101 of FIGs. 3 and 5, respectively). The light exposure monitor is configured to detect an illuminance from a surface of a wafer. (*See* para. [0053].) The light exposure monitor *is not located within the light absorption enclosure*, an enclosure where a gas interacts with a light transmission traversing through the light absorption enclosure. (*See* paras. [0059]-[0061].) Accordingly, the light exposure monitor does not provide an output signal that represents an interaction between the light transmission and the gas dispersed in the light absorption enclosure. Nowhere does Shiozawa teach or suggest “an enclosure having a top surface and a bottom surface, the beam of radiation traversing through the top and bottom surfaces of the enclosure, and having a radiation-energy detector configured to determine the energy of the beam of radiation, the beam of radiation passing at least partly through a region of interactive gas, wherein the detector comprises **a sensor located within the enclosure and configured to output a signal that represents an interaction of the beam of radiation with the region of gas**, and to measure, out of a path of the beam of radiation, particles scattered from the path of the beam of radiation

due to the interaction to determine the amount of interaction of the beam of radiation with the region of gas,” as recited in claim 26, and similarly recited in claims 50-52, 54, and 55.

The Examiner states, which Applicants do not acquiesce to, that Ishihara teaches measuring particles scattered from a path of the beam of radiation due to the interaction of the beam with the interactive gas. (*See* Office Action, 08/28/08, pp. 10 and 11.) However, Ishihara is not stated to teach, nor does it suggest, at least the above-noted distinguishing features of claims 26, 50-52, 54, and 55 with respect to Shiozawa. Therefore, because Ishihara cannot cure the deficiencies of Shiozawa, these applied references cannot be used to establish a *prima facie* case of obviousness.

In view of the above, Applicants respectfully request the Examiner to find claims 26, 50-52, 54, and 55 patentable over the cited references. At least based on their dependency to claims 26 and 52, claims 27-34, 36-39, 41, 43, 44, 47, 48, and 53 should also be found patentable over the applied references, as well as for their additional distinguishing features.

Nishi in view of Tanaka

Claim 35 was rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nishi, as applied to claim 26 above, and further in view of U.S. Pat. Appl. Pub. No. 2003/0020888 to Tanaka *et al.* (hereinafter “Tanaka”). Applicants respectfully traverse.

The Examiner states, which Applicants do not acquiesce to, that Tanaka teaches radiation in the range of 5-20nm and a detector to detect such radiation. (*See* Office Action, 08/28/08, p. 11.) However, Tanaka is not stated to teach, nor does it suggest, at

least the above-noted distinguishing features of claim 26 with respect to Nishi. Therefore, because Tanaka cannot cure the deficiencies of Nishi, these applied references cannot be used to establish a *prima facie* case of obviousness. Given that claim 35 depends on claim 26, Applicants respectfully submit that claim 35 is patentable over the cited references for the same reasons described above with respect to claim 26, as well as for its additional distinguishing features.

Nishi in view of Kley

Claims 45 and 46 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nishi, as applied to claim 26, and further in view of U.S. Pat. No. 6,353,219 to Kley ("Kley"). Applicants respectfully traverse.

The Examiner states, which Applicants do not acquiesce to, that Kley teaches a sensor with an electrode that is charged at a potential opposite to a charged particle to which it is sensitive. (*See* Office Action, 08/28/08, p. 11.) However, Kley is not stated to teach, nor does it suggest, at least the above-noted distinguishing features of claim 26 with respect to Nishi. Therefore, because Tanaka cannot cure the deficiencies of Nishi, these applied references cannot be used to establish a *prima facie* case of obviousness. Given that claims 45 and 46 depend on claim 26, Applicants respectfully submit that claims 45 and 46 are patentable over the cited references for the same reasons described above with respect to claim 26, as well as for their additional distinguishing features.

Shiozawa

Claims 10 and 11 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shiozawa. Applicants respectively traverse.

The Examiner states, which Applicants do not acquiesce to, that it would have been obvious to one having ordinary skill in the art that gas can enter an enclosure at a speed ten times the speed of sound. (*See* Office Action, 08/28/08, p. 12.) However, given that claims 10 and 11 depend on claim 1, Applicants respectfully submit that claims 10 and 11 are patentable over the cited reference for the same reasons described above with respect to claim 1, as well as for their additional distinguishing features.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejections under 35 U.S.C. § 103(a).

In view of the above, Applicants respectfully request the Examiner to pass claims 1-11, 13-55, and 62 to allowance.

Rejections under Nonstatutory Obviousness-Type Double Patenting

Claims 1-7, 9, 13, 15-19, 21-25, and 62 were rejected on the grounds of nonstatutory obviousness-type double patenting as allegedly being unpatentable over claims 1-3 and 5-23 of U.S. Pat. No. 6,538,716 (the '716 patent). Claims 8, 14, 30, and 35 were rejected on the grounds of nonstatutory obviousness-type double patenting as allegedly being unpatentable over claims 1, 5, 7, and 19 of the '716 patent in view of Tanaka. Further, claims 26, 29, 31-34, 36, 39-43, 47-49, and 50-55 were rejected on the grounds of nonstatutory obviousness-type double patenting as allegedly being unpatentable over claims 1, 2, and 5-23 of the '716 patent in view of Mori and Ishihara.

In view of the amendments above, Applicants believe that the rejected claims (as amended) are non-obvious variants of the previously patented claims referred to. As such, Applicants do not believe that a terminal disclaimer is merited at this time. However, if the Examiner finds that the present claims are allowable, but for the obviousness-type double patenting rejections, Applicants kindly request the Examiner to contact the undersigned regarding filing a terminal disclaimer at that time.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejections based on the grounds of non-statutory obvious-type double patenting.

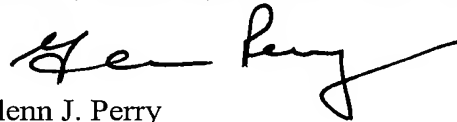
Conclusion

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.



Glenn J. Perry
Attorney for Applicants
Registration No. 28,458

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1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

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